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MAYER, BROWN, ROWE & MAW LLP
1909 K STREET, N.W.
WASHINGTON, DC 20006

EXAMINER	
PERILLA, JASON M	
ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 10/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/846,205	Applicant(s) LEE ET AL.	
	Examiner Jason M. Perilla	Art Unit 2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-6 and 8-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-6 and 8-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 2, 4-6, and 8-16 are pending in the instant application.

Drawings

2. The drawings were received on August 7, 2005. These drawings are accepted by the Examiner.

Response to Arguments/Amendments

3. In view of the amendments to the claims filed August 7, 2005, the claim objections set forth in the final office action dated June 23, 2005 have been withdrawn.

4. In view of the amendments to the claims, the rejection of claims 6, 8, 9, and 14-16 under 35 U.S.C. § 112, second paragraph, have been withdrawn.

5. Applicant's arguments filed August 7, 2005 against the prior art rejection under 35 U.S.C. 103(a) including at least Bremer (U.S. 4464767) have been fully considered, but they are not persuasive. The independent claims have been amended to include band splitting means which distributes data *based on predetermined and <u>different</u> data transmission rates* of the predetermined number of band TX processing means. However, the advantageous combination of Bremer in view of Samueli et al (U.S. 6144712; hereafter "Samueli") is such that one is motivated to combine a QAM transmitting apparatus having a multiplicity of transmitting means with a variable data rate transmitter. Hence, the result is a QAM transmitter having multiple transmitters with a variable transmit data rate. Therefore, is obvious that the multiplicity of transmitting means could potentially have different transmission rates. Samueli discloses that, because variable rate digital signals are transmitted on a single fixed

frequency at a single sampling frequency, sampling frequency jitter may occur (col. 1, lines 60-68). Therefore, care must be taken to appropriately transmit data on a single fixed frequency so that sampling jitter does not appear at the side of the receiver. Bremer provides that the use of multiple QAM transmitters allows for higher data rates using transmitters of a lower speed (col. 1, lines 25-35). The combination of Bremer in view of Samueli provides a QAM transmitter with additional transmission speed *and* sampling jitter reduction because the data rate of the whole can be divided into appropriately divided parts (by data rate) which are easily transmitted on a single frequency without causing sampling jitter.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bremer (US 4464767) in view of Samueli et al (US 6144712 – IDS reference AA; hereafter "Samueli").

Regarding claim 1, Bremer discloses by figure 3 a QAM (Quadrature Amplitude Modulation) transmitting apparatus having a multiplicity of transmission bands (abstract), comprising: band splitting means (ref. 28; col. 2, lines 14-20) for distributing TX data ("binary data") to a predetermined number of band TX processing means (refs. 22, 24, and 26); the predetermined number of band TX processing means symbol-

encoding the output data of the band splitting means ("QAM Level Encoder"), and converting the TX data to a passband signal ("QAM Filter and Carrier Modulator"); and synthesizing means (38) for synthesizing the passband signal outputted from a predetermined number of the band TX processing means (col. 2, lines 28-32). The "QAM Filter and Carrier Modulator" contained in each of the QAM modulators illustrated in figure 3 converts the TX data to a passband or, equivalently, modulates the signals onto a carrier in a frequency band which may be transmitted. Bremer does not disclose a) a QAM transmitting apparatus having variable transmission rates; b) TC (Transmission Convergence) sub-layer means for performing frame processing and error correction for TX (transmitting) data; c) pulse-shaping and interpolating the symbol-encoded data; or d) digital-to-analog converting and outputting means for converting the synthesized digital TX data to an analog synthesized TX signal to output. However, Samueli teaches a) a variable rate QAM transmitter (abstract) by figure 1 (col. 2, lines 40-45). Samueli teaches that a variable rate QAM transmitter may take a variable rate data stream as input (i.e. 0.1-20 megabits/sec; col. 1, lines 25-30). Using a variable rate transmitter allows the data being introduced to the system to change with time. Regarding limitation b), Samueli teaches a sub-layer (TC) means (fig. 1, ref. 16; col. 2, lines 49-55) for performing frame processing ("inserting preamble") and error correction for transmitting data. Samueli teaches the use of a frame processor and error correction encoder to condition the data to be transmitted for the correct reception of the data on the side of the receiver. Regarding limitation c), Samueli illustrates and teaches pulse-shaping (fig. 1, refs. 24 and 26; col. 3, lines 1-2) and interpolating the

symbol-encoded data (fig. 1, refs, 28 and 30; col. 3, lines 5-17) because pulse-shaping filters the data to remove unwanted frequencies and interpolating conditions the data to have a proper common sampling interval for modulating and digital-to-analog conversion. Regarding limitation d), Samueli teaches digital-to-analog converting and outputting means (fig. 1, ref. 40) for converting the synthesized digital TX data to an analog synthesized TX signal to output (fig. 1, ref. 42) because the digital information must be converted into analog form before it may be transmitted over a channel. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to use the components of a variable rate QAM transmitter as taught by Samueli, which meet the limitations of a) – d) above, in the QAM transmitter of Bremer because they could advantageously be used to transmit data at various data rates according to the amount of data which is to be transmitted and condition the input data for wireless transmission. In the apparatus of Bremer in view of Samueli, the TC sub-layer means (Samueli; figure 1, ref. 16) is utilized to insert a preamble and error correction into the data to be transmitted for data conditioning as understood by one having skill in the art before it is passed to the band splitting means (Bremer; fig. 3, ref. 28). The pulse shaping and interpolating means of Samueli (fig. 1, refs. 24, 26, 28, and 30) would be inserted between the QAM Level Encoder and QAM Filter and Carrier Modulator of Bremer (fig. 3, ref. 22) as motivated above. The QAM level encoder of Bremer is analogous to the QAM Symbol mapper of Samueli (fig. 1, ref. 18). Finally, in the apparatus of Bremer in view of Samueli, the DAC of Samueli would be positioned after the synthesizing means of Bremer (fig. 3, ref. 38) to facilitate in the

transmission of an analog waveform over a channel as understood by one having skill in the art.

Further regarding claim 1, in view of the combination of multiple variable rate QAM transmitters, it would be obvious that the band splitting means (Bremer; fig. 3, ref. 28) would distribute the TX data to each of the predetermined number of band TX processing means (Bremer; fig. 3, refs. 22, 24, and 26) based upon a predetermined and different data transmission rate. That is, the data rate of each of the distributed data streams output by the band splitting means is based upon the total amount of data to be transmitted and the data rate of each individual variable QAM transmitters such that sampling jitter may be reduced. Because each of the variable rate transmitters may accept various data rates, the system would be very flexible to higher data rate transmission with reduced sampling jitter at the side of the receiver.

Regarding claim 2, Bremer in view of Samueli disclose the limitations of claim 1 as applied above. Further, in the apparatus of Bremer in view of Samueli, it is inherent that the data transmission rate of the TC sub-layer means is equal to sum of data transmission rates of the band TX processing means. The TC sub-layer means may be applied before the band splitting means. Therefore, the TC sub-layer supplies all of the data to the band splitting means and, hence, to all of the band TX processing means.

Regarding claim 10, Bremer in view of Samueli disclose the limitations of the claim as applied to claim 1 above.

Regarding claim 11, Bremer in view of Samueli disclose the limitations of the claim as applied to claim 2 above.

8. Claims 4, 5, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bremer in view of Samueli, and in further view of Kaku et al (US 5987064; hereafter "Kaku").

Regarding claim 4, Bremer in view of Samueli disclose the limitations of claim 1 as applied above. Bremer in view of Samueli do not expressly disclose that the band splitting means distributes the TX data to each of the predetermined number of band TX processing means in units of bytes. However, Kaku discloses an exemplary embodiment of a 256 QAM (1 byte per symbol) constellation used in a QAM transmitter (fig. 6; col. 2, lines 60-65; col. 4, lines 60-65) for a modem. Further, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to distribute the TX data to each of the band TX processing means in units of bytes as suggested by Kaku. Applicant has not disclosed that distributing the TX data to each of the band TX processing means in units of bytes provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected the transmitter of Bremer in view of Samueli to perform equally well with distributing the TX data to each of the band TX processing means in units of bytes because a QAM transmitter can rely upon any constellation size (bits per symbol) limited only by the transmission channel conditions and it is advantageous to transmit the greatest bits per symbol possible for the largest possible transmission rates.

Regarding claim 5, Bremer in view of Samueli disclose the limitations of claim 1 as applied above. Bremer in view of Samueli do not expressly disclose that the band

TX processing means encodes the TX data in units of bytes. However, Kaku teaches an exemplary embodiment of a 256 QAM (1 byte per symbol) constellation used in a QAM transmitter (fig. 6; col. 2, lines 60-65; col. 4, lines 60-65) for a modem. Further, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to encode the TX data in units of bytes as suggested by Kaku. Applicant has not disclosed that encoding the TX data in units of bytes provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected the transmitter of Bremer in view of Samueli to perform equally well with encoding the TX data in units of bytes because a QAM transmitter can rely upon any constellation size (bits per symbol) limited only by the transmission channel conditions and it is advantageous to transmit the greatest bits per symbol possible for the largest possible transmission rates.

Regarding claim 12, Bremer in view of Samueli, and in further view of Kaku disclose the limitations of the claim as applied to claim 4 above.

Regarding claim 13, Bremer in view of Samueli, and in further view of Kaku disclose the limitations of the claim as applied to claim 4 above.

9. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bremer in view of Samueli, and in further view of Yagi (US 5995168).

Regarding claim 6, Bremer in view of Samueli disclose the limitations of claim 1 as applied above which provide for a QAM transmitting apparatus having a multiplicity of transmission bands. In light of the transmission apparatus of Bremer in view of Samueli, although it is not explicitly disclosed by such figures, it is implied and would

have been at least obvious to implement a corresponding receiving apparatus to receive the signal transmitted. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to implement a corresponding receiving apparatus to the transmission apparatus (claim 1) of Bremer in view of Samueli comprising a QAM receiving apparatus having a multiplicity of transmission bands with variable transmission rates because it would provide utility for the transmission. The obvious receiving apparatus of Bremer in view of Samueli **would be the corollary** of the transmission apparatus to one having ordinary skill in the art, and *the references cited below are the corresponding references in the transmission apparatus.* Hence, the receiving apparatus would be comprising: analog-to-digital converting means (Samueli; fig. 1, ref. 40) for converting an analog signal received through a transmission line to a digital RX (receiving) signal; band distributing means (Bremer; "synthesizing means", fig. 3, ref. 38) for distributing the digital RX signal to a predetermined number of band RX processing means at different transmission rates; the band RX processing means (Bremer; fig. 3, refs. 22, 24, and 26) for converting the RX signal distributed from the band distributing means to a baseband signal (Bremer; fig. 3, "Carrier Modulator") and converting the compensated RX signal by QAM-decoding to a symbol (Bremer; fig. 3, "QAM Level Encoder"); band multiplexing means for multiplexing the output data from the predetermined number of the band RX processing means (Bremer; fig. 3, ref. 28); and TC (Transmission Convergence) sub-layer means for performing frame processing and error correction for the multiplexed RX data from the band multiplexing means (Samueli; fig. 1, ref. 16; col. 2, lines 49-55).

The QAM receiving apparatus of Bremer in view of Samueli does not disclose compensating signal distortion of the baseband signal caused by the transmission line. However, Yagi teaches a QAM receiver by figure 1 having a well known digital equalizer (104) which compensates signal distortion of the baseband signal. Yagi teaches that the digital equalizer performs adaptive equalization of amplitude delay to correct for distortions which occur in the transmission path (col. 3, lines 46-60). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize an adaptive equalizer as taught by Yagi in the QAM receiver of Bremer in view of Samueli because it would compensate for the signal distortion caused by the transmission line to provide better symbol decisions.

Regarding claim 14, Bremer in view of Samueli, and in further view of Yagi disclose the limitations of the claim as applied to claim 6 above.

10. Claims 8 and 9, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bremer in view of Samueli, in further view of Yagi, and in further view of Kaku.

Regarding claim 8, Bremer in view of Samueli, and in further view of Yagi, disclose the limitations of claim 6 as applied above. Further, it would have been obvious that the band distributing means distributes the RX data to the TC sub-layer means in units of bytes as taught by Kaku and applied to claim 4 above.

Regarding claim 9, Bremer in view of Samueli, and in further view of Kaku disclose the limitations of claim 6 as applied above. Further, it would have been

obvious that the band RX processing means decodes the RX data in units of bytes as taught by Kaku and applied to claim 5 above.

Regarding claim 15, Bremer in view of Samueli, and in further view of Yagi, disclose the limitations of claims 14 as applied above. Further, Bremer in view of Samueli, in further view of Yagi, and in further view of Kaku disclose the additional limitations of the claim as applied to claim 8 above.

Regarding claim 16, Bremer in view of Samueli, and in further view of Yagi, disclose the limitations of claims 14 as applied above. Further, Bremer in view of Samueli, in further view of Yagi, and in further view of Kaku disclose the additional limitations of the claim as applied to claim 9 above.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
October 24, 2005

jmp

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER